Outcome after Surgical Treatment for Late Recurrent Lumbar Disc Herniations in Standard Open Microsurgery

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■ PURPOSE: **There is a lack of studies highlighting the outcome by different scores or parameters after surgery for recurrent disc herniations of the lumbar spine at the initial herniation site. This study assessed the quality of life after surgical treatment of recurrent herniations with different standardized validated outcome instruments.**

■ METHODS: **During a 24-month period, 64 patients underwent (microscope assisted) surgery for recurrent disc herniations of the lumbar spine. The postoperative quality of life was tested with Short Form-36, the Oswestry Disability Index, the EuroQol health status 5D, and Prolo questionnaires. Leg and back pain before and after surgery was assessed.**

■ RESULTS: **The patients showed a good overall outcome, but still not satisfying enough compared with the very good surgical results reported in the literature, for the surgical treatment of primary disc herniations.**

■ CONCLUSIONS: **Patients have to be informed carefully before surgery of recurrent lumbar disc herniations because of the less-promising outcome than after first time surgery for a lumbar disc herniation.**

INTRODUCTION

The incidence of lumbar disc herniations is high, and the pain and immobility often cause an inability to work and a reduction in health-related quality of life (HrQoL). In Germany, there are almost 100,000 inpatients per year treated for lumbar disc herniations with symptomatic radicular pain. No exact data exist, however, regarding the ratio of conservative versus surgical treatment of primary or recurrent disc herniations, although recurrent disc herniation particularly remains a major source of disability.[1,2] In 2008 approximately 40% of these 100,000 patients in Germany stayed in hospital for 4–7 days and another 35% for 1–2 weeks.[3]

Despite the good clinical outcomes after primary surgery of lumbar disc herniations, the risk for recurrent disc herniations at the same level and the same side is reported to be as high as 5%–15%[4-7]; however, only few studies have evaluated the long-term results of primary surgery for lumbar disc herniations with 10 or more years with regard to the incidence of recurrent herniations. Gaston et al.[7] estimated a 10-year incidence for recurrent herniations of 7.9% based on their patient cohort with a mean follow-up of 5.3 years and a 4.9% rate of recurrent disc herniations. This result is well in accordance with the reherniation rate of 8.6% in a study with 8.5-year follow-up by Vik et al.[6]

Surgical treatment of recurrent disc herniations is indicated for cases of persistent and severe pain refractory to conservative therapy or for new motor deficits. So far, the outcome in terms of HrQoL after surgery for recurrent disc herniations has been poorly investigated. Most studies used a single-outcome analysis, only, and quality of life as assessed by the Short Form-36 (SF-36) or EuroQol health status 5D (EQ5D) was not analyzed.[8-13] The results of these studies show differing results to some extent, especially concerning the results of second-time surgery in comparison with the results of first-time surgery. Therefore, in the present study we evaluated a cohort of patients treated surgically for a recurrent disc herniation by using a set of outcome scales including assessment of HrQoL.

Key words
- Lumbar spine outcome
- Quality of life
- Recurrent disc herniation
- Revision surgery

Abbreviations and Acronyms
CT: Computed tomography
EQ5D: EuroQol health status 5D
HrQoL: Health-related quality of life
MRI: Magnetic resonance imaging
ODI: Oswestry Disability Index
SF-36: Short Form 36
VAS: Visual analogue scale

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MATERIALS AND METHODS

Our departmental database was scanned for patients who underwent operation for recurrent disc herniations within a 24-month period. The available data (including imaging as magnetic resonance imaging [MRI], computed tomography [CT] scans, and plain x-rays, functional x-ray, patient charts, and electrophysiology if available) of each patient was carefully studied and checked for inclusion criteria: 1) patients with a clear recurrent disc herniation at the same side and level previously operated; 2) a pain-free interval of at least 6 months after primary surgery; 3) typical radicular pain; 4) radicular pain as the main symptom (the presence of load-dependent or start-up back pain was not a exclusion criterion); and 5) no significant response to intensive conservative treatment or a new motor deficit. Exclusion criteria were as follows: 1) any other kind of surgery at the same or different level of the lumbar spine not associated with the herniation or reherniation; 2) lumbar canal and foraminal stenosis or instability (if shown in functional x-ray); and 3) Modic type II and III disc degeneration.

Patients were selected in a retrospective fashion by assessment of the surgical reports. Surgeries were performed by 4 senior surgeons. In all cases, an interlaminar refenestration was performed, but no laminectomies were done. All identified patients received a standardized questionnaire by mail including SF-36, EQ5D, Prolo, and the Oswestry Disability Index (ODI). Besides these standardized questionnaires, patients were asked to rate back and leg pain before surgery and at the date they received our letter using the visual analogue scale (VAS) for pain. Patient overall satisfaction was rated on a 5-point scale: 1 = excellent, 2 = good, 3 = fair, 4 = poor with marginal improvement, and 5 = not satisfied, according to a freely modified MacNab criteria scoring system. Pain medication before and 1 month after the operation also was noted. Patients were asked in the cover letter to fill out the forms when they received the documents and to send them back. Patients with missing answers after 1 month were contacted and interviewed by telephone, if available and the patient was willing. Duration between pain onset and surgery, sex, body mass index, age and level of recurrent disc herniation were all investigated to evaluate a possible relationship to the different questionnaires.

Statistical analyses were conducted with the use of IBM SPSS Statistics 19 (IBM Corp, Armonk, New York, USA) and R software, version 2.13.2 (R Development Core Team).

Categorical variables are presented as frequencies and percentages, and continuous variables as medians and ranges. A paired t test was used to compare the VAS results before and after surgery. To compare the VAS results and patient's satisfaction with continuous variables, the Spearman correlation coefficient was calculated. For the evaluation of differences between categorical variables in theses outcome parameters an exact Mann–Whitney U test was used.

The analysis of the standardized questionnaires was done with Spearman correlation coefficients for continuous variables and with unpaired t tests for categorical variables. All statistical tests were 2-sided, with a significance level of 0.05 and have not been adjusted for multiple testing.

RESULTS

Fifty of the identified 64 patients completed the forms, which equates to a response rate of 79%. All others could not be contacted by mail or telephone call or were not willing to answer the questionnaires. Of the 50 analyzable patients, 18 were female, 32 male, and the mean age was 53 years (range, 33–83 years). The mean follow-up period after surgery of the recurrent herniation was 13 months (5–31 months' interval), and the average time between first surgery and revision surgery 72 months (8–192 months). The operations were in 15 cases at L5/S1 (30%), in 26 cases at L4/5 (53%), in 7 cases at L3/4 (14%), and in 2 cases at L2/3 (4%). To diagnose recurrent disc herniation, MRI only was used in 42 patients (84%), plain CT in 3 (6%), and myelography plus postmyelography CT scan in addition to MRI in 5 patients (10%).

During surgery for recurrent disc herniations of the 50 patients, there were 3 (6%) dural tears. After suture and sealing, all patients showed normal wound healing without any signs of infection, and no revision surgery attributable to a continuing cerebrospinal fluid fistula had to be performed. There were no further surgical morbidities and no mortalities. Apart from refraining from strenuous physical activity until the primary wound healing was completed, there were no special restrictions regarding activity after surgery in accordance to our own policy and in accordance to the literature.[14]

A significant mean improvement measured by VAS of 2.8 points (95% confidence interval 1.9–3.6) for the radicular pain and of 3.0 points (95% confidence interval 2.1–3.9) for low back pain was achieved by surgical treatment of the recurrent herniation. Three patients (6%) indicated a clear worsening after surgery in the VAS scale, 1 in leg pain, 1 in back pain and 1 in both leg and back pain.

However, the HrQoL as assessed by SF-36 showed inferior results for all aspects of mental and physical function of 1 SD, compared with normative population data, especially the questions for the Physical-Functioning, Role-Physical, and Bodily-Pain show limitations in daily life (Figure 1).

In the Prolo score, the median was 6 points (4 points in the economic and 2 points in the functional status). A total of 16% reached an overall good outcome (8–10 points), 39% a moderate outcome (6–7 points), and 45% a poor outcome (0–5 points).

ODI ranked in the range of severe limitation with a median of 41.7% (bedbound 80%–100%, crippled 60%–80%, severe disability 40%–60%, moderate disability 20%–40%, minimal disability 0%–20%). EQ5D showed in all 5 aspects no problems to moderate problems (mobility mean: 1.6 points; self-care mean: 1.3 points; usual activities mean: 1.7 points; pain mean: 2.1 points; and anxiety/depression mean: 1.5 points), the mean EQ-VAS (a patient's self-rated health on a visual analogue scale, ranging from 0% to 100%) was 54% (age group younger than 35 only one value with 90%, 35–44 years: 56%, 45–54 years: 54%, 55–64 years: 54%, 65–74 years: 43% and 75–84 years: 50%).

The general question of improvement after surgery was answered by 44% as excellent, by 22% as good, by 16% as fair, by 6% as poor with marginal improvement, and by 12% as not satisfied. We found a slight, but significant correlation between age and the subjective rating of surgical outcome. Older patients tended to be less satisfied than younger patients (Spearman rho = 0.311, P = 0.028).

Duration between pain onset and surgery, sex, body mass index, age and level of recurrent disc herniation was investigated with